

Median hourly earnings of job printers were \$13.61 in 2000. The middle 50 percent earned between \$10.00 and \$17.67 an hour. The lowest 10 percent earned less than \$7.81, and the highest 10 percent earned more than \$21.88 an hour. Median hourly earnings in commercial printing, the industry employing the largest number of job printers, were \$14.68 in 2000.

Wage rates for prepress technicians and workers vary according to occupation, level of experience, training, location, and size of the firm, and whether they are union members.

Related Occupations

Prepress technicians and workers use artistic skills in their work. These skills also are essential for artists and related workers, etchers and engravers, designers, and desktop publishers. In addition to typesetters, other workers who operate machines equipped with keyboards include data entry and information processing workers.

Sources of Additional Information

Details about apprenticeship and other training programs may be obtained from local employers such as newspapers and printing shops, or from local offices of the State employment service.

For information on careers and training in printing and the graphic arts, write to:

► Printing Industries of America, 100 Daingerfield Rd., Alexandria, VA 22314. Internet:

http://www.gain.org/servlet/gateway/PIA_GATF/non_index.html

► Graphic Communications Council, 1899 Preston White Dr., Reston, VA 20191. Internet: <http://www.npes.org/edcouncil/index.html>

► Graphic Communications International Union, 1900 L St. NW., Washington, DC 20036. Internet: <http://www.gciu.org>

► Graphic Arts Technical Foundation, 200 Deer Run Rd., Sewickley, PA 15143. Internet: <http://www.gatf.org>

Printing Machine Operators

(O*NET 51-5023.01, 51-5023.02, 51-5023.03, 51-5023.04, 51-5023.05, 51-5023.06, 51-5023.07, 51-5023.08, 51-5023.09)

Significant Points

- Most are trained informally on the job.
- Employment growth will be slowed by the increasing use of new, more efficient computerized printing presses.
- Jobseekers are likely to face keen competition; opportunities should be best for persons who qualify for formal apprenticeship training or who complete postsecondary training programs.

Nature of the Work

Printing machine operators prepare, operate, and maintain the printing presses in a pressroom. Duties of printing machine operators vary according to the type of press they operate—offset lithography, gravure, flexography, screen printing, or letterpress. Offset lithography, which transfers an inked impression from a rubber-covered cylinder to paper or other material, is the dominant printing process. With gravure, the recesses on an etched plate or cylinder are inked and pressed to paper. Flexography is a form of rotary printing in which ink is applied to the surface by a flexible rubber printing plate with a raised image area. Gravure and flexography

should increase in use, but letterpress, in which an inked, raised surface is pressed against paper, will be phased out. In addition to the major printing processes, plateless or nonimpact processes are coming into general use. Plateless processes—including electronic, electrostatic, and ink-jet printing—are used for copying, duplicating, and document and specialty printing, usually by quick and in-house printing shops.

To prepare presses for printing, machine operators install and adjust the printing plate, adjust pressure, ink the presses, load paper, and adjust the press to the paper size. Press operators ensure that paper and ink meet specifications, and adjust margins and the flow of ink to the inking rollers accordingly. They then feed paper through the press cylinders and adjust feed and tension controls.

While printing presses are running, press operators monitor their operation and keep the paper feeders well stocked. They make adjustments to correct uneven ink distribution, speed, and temperatures in the drying chamber, if the press has one. If paper jams or tears and the press stops, which can happen with some offset presses, operators quickly correct the problem to minimize downtime. Similarly, operators working with other high-speed presses constantly look for problems, making quick corrections to avoid expensive losses of paper and ink. Throughout the run, operators occasionally pull sheets to check for any printing imperfections.

In most shops, press operators also perform preventive maintenance. They oil and clean the presses and make minor repairs.

Machine operators' jobs differ from one shop to another because of differences in the kinds and sizes of presses. Small commercial shops are operated by one person and tend to have relatively small presses, which print only one or two colors at a time. Operators who work with large presses have assistants and helpers. Large newspaper, magazine, and book printers use giant "in-line web" presses that require a crew of several press operators and press assistants. These presses are fed paper in big rolls, called "webs," up to 50 inches or more in width. Presses print the paper on both sides; trim, assemble, score, and fold the pages; and count the finished sections as they come off the press.

Most plants have or will soon have installed printing presses with computers and sophisticated instruments to control press operations, making it possible to set up for jobs in less time. Computers allow press operators to perform many of their tasks electronically. With this equipment, press operators monitor the printing process on a control panel or computer monitor, which allows them to adjust the press electronically.



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Working Conditions

Operating a press can be physically and mentally demanding, and sometimes tedious. Printing machine operators are on their feet most of the time. Often, operators work under pressure to meet deadlines. Most printing presses are capable of high printing speeds, and adjustments must be made quickly to avoid waste. Pressrooms are noisy, and workers in certain areas wear ear protectors. Working with press machinery can be hazardous, but accidents can be avoided when safe work practices are observed. The threat of accidents is less with newer computerized presses because operators make most adjustments from a control panel. Many press operators work evening, night, and overtime shifts.

Employment

Printing machine operators held about 222,000 jobs in 2000. Most press operator jobs were in newspaper plants or in firms handling commercial or business printing. Commercial printing firms print newspaper inserts, catalogs, pamphlets, and the advertisements found in mailboxes, and business form establishments print items such as business cards, sales receipts, and paper used in computers. Additional jobs were in the “in-plant” section of organizations and businesses that do their own printing—such as banks, insurance companies, and government agencies.

The printing and publishing industry is one of the most geographically dispersed in the United States, and press operators can find jobs throughout the country. However, jobs are concentrated in large printing centers such as New York, Los Angeles, Chicago, Philadelphia, Washington, DC, and Dallas.

Training, Other Qualifications, and Advancement

Although completion of a formal apprenticeship or a postsecondary program in printing equipment operation continue to be the best ways to learn the trade, most printing machine operators are trained informally on the job while working as assistants or helpers to experienced operators. Beginning press operators load, unload, and clean presses. With time, they move up to operating one-color sheet-fed presses and eventually advance to multicolor presses. Operators are likely to gain experience on many kinds of printing presses during the course of their career.

Apprenticeships for press operators in commercial shops take 4 years. In addition to on-the-job instruction, apprenticeships include related classroom or correspondence school courses. Once the dominant method for preparing for this occupation, apprenticeships are becoming less prevalent.

In contrast, formal postsecondary programs in printing equipment operation offered by technical and trade schools and community colleges are growing in importance. Some postsecondary school programs require 2 years of study and award an associate degree, but most programs can be completed in 1 year or less. Postsecondary courses in printing are increasingly important because they provide the theoretical knowledge needed to operate advanced equipment.

Persons who wish to become printing machine operators need mechanical aptitude to make press adjustments and repairs. Oral and writing skills also are required. Operators should possess the mathematical skills necessary to compute percentages, weights, and measures, and to calculate the amount of ink and paper needed to do a job. Because of technical developments in the printing industry, courses in chemistry, electronics, color theory, and physics are helpful.

Technological changes have had a tremendous effect on the skills needed by printing machine operators. New presses now require operators to possess basic computer skills. Even experienced operators periodically receive retraining and skill updating. For example, printing plants that change from sheet-fed offset presses to

Web offset presses have to retrain the entire press crew because skill requirements for the two types of presses are different. Web offset presses, with their faster operating speeds, require faster decisions, monitoring of more variables, and greater physical effort. In the future, workers are expected to need to retrain several times during their career.

Printing machine operators may advance in pay and responsibility by working on a more complex printing press. Through experience and demonstrated ability, for example, a one-color sheet-fed press operator may become a four-color sheet-fed press operator. Others may advance to pressroom supervisor and become responsible for an entire press crew.

Job Outlook

Persons seeking jobs as printing machine operators are likely to face keen competition from experienced operators and prepress workers who have been displaced by new technology, particularly those who have completed retraining programs. Opportunities to become printing machine operators are likely to be best for persons who qualify for formal apprenticeship training or who complete postsecondary training programs.

Employment of printing machine operators is expected to grow more slowly than the average for all occupations through 2010. Although demand for printed materials will grow, employment growth will be slowed by the increased use of new, more efficient computerized printing presses. Most job openings will result from the need to replace operators who retire or leave the occupation.

Most new jobs will result from expansion of the printing industry as demand for printed material increases in response to demographic trends, U.S. expansion into foreign markets, and growing use of direct mail by advertisers. Demand for books and magazines will increase as school enrollments rise, and as substantial growth in the middle-aged and older population spurs adult education and leisure reading. Additional growth should stem from increased foreign demand for domestic trade publications, professional and scientific works, and mass-market books such as paperbacks.

Continued employment in commercial printing will be spurred by increased expenditures for print advertising materials to be mailed directly to prospective customers. New market research techniques are leading advertisers to increase spending on messages targeted to specific audiences, and should continue to require the printing of a wide variety of newspaper inserts, catalogs, direct mail enclosures, and other kinds of print advertising.

Other printing, such as newspapers, books, and greeting cards, also will provide jobs. Experienced press operators will fill most of these jobs because many employers are under severe pressure to meet deadlines and have limited time to train new employees.

Earnings

Median hourly earnings of printing machine operators were \$13.57 in 2000. The middle 50 percent earned between \$10.38 and \$17.80 an hour. The lowest 10 percent earned less than \$8.09, and the highest 10 percent earned more than \$21.92 an hour. Median hourly earnings in the industries employing the largest numbers of printing machine operators in 2000, were:

Commercial printing	\$14.91
Newspapers	14.71
Paperboard containers and boxes	14.44
Miscellaneous converted paper products	13.78
Mailing, reproduction, and stenographic services	10.92

The basic wage rate for a printing machine operator depends on the type of press being run and the geographic area in which the

work is located. Workers covered by union contracts usually had higher earnings.

Related Occupations

Other workers who set up and operate production machinery include machine setters, operators, and tenders—metal and plastic, bookbinders and bindery workers, and various precision machine operators.

Sources of Additional Information

Details about apprenticeships and other training opportunities may be obtained from local employers such as newspapers and printing shops, local offices of the Graphic Communications International

Union, local affiliates of Printing Industries of America, or local offices of the State employment service.

For general information about press operators, write to:

► Graphic Communications International Union, 1900 L St. NW., Washington, DC 20036. Internet: <http://www.gciu.org>

For information on careers and training in printing and the graphic arts, write to:

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Textile, Apparel, and Furnishings Occupations

(O*NET 51-6011.01, 51-6011.02, 51-6011.03, 51-6021.01, 51-6021.02, 51-6021.03, 51-6031.01, 51-6031.02, 51-6041.00, 51-6042.00, 51-6051.00, 51-6052.01, 51-6052.02, 51-6061.00, 51-6062.00, 51-6063.00, 51-6064.00, 51-6091.01, 51-6092.00, 51-6093.00, 51-6099.99)

Significant Points

- Most workers learn through on-the-job training.
- Employment is expected to decline for most occupations, primarily due to increased imports, laborsaving machinery, and offshore assembly.
- Earnings of most workers are low.

Nature of the Work

Textiles and leather clothe our bodies, cover our furniture, and adorn our homes. Textile, apparel, and furnishings workers produce these materials and fashion them into a wide range of products that we use in our daily lives. Jobs range from those that employ computers, to those that operate large industrial machinery and smaller power equipment, to those that involve substantial handwork.

Textile machine operators. Textile machinery operators run machines that make textile products from fibers. Textiles are the basis of towels, bed linens, hosiery and socks, and nearly all clothing, but they also are a key ingredient of products ranging from roofing to tires. The first step in manufacturing textiles is preparing the natural or synthetic fibers. *Extruding and forming machine operators, synthetic and glass fibers* set up and operate machines that extrude—or force—liquid synthetic material such as rayon, fiberglass, or liquid polymers out through small holes and draw out filaments. Other operators put natural fibers such as cotton, wool, flax, or hemp through carding and combing machines that clean and align them into short lengths called “sliver.” When sliver is produced, different types of natural fibers and synthetics filaments may be combined to give the product a desired texture, durability, or other characteristics. *Textile winding, twisting, and drawing out machine operators* take the sliver and draw out, twist, and wind it to produce yarn, taking care to repair any breaks.

Textile bleaching and dyeing machine operators control machines that wash, bleach, or dye either yarn or finished fabrics and other products. *Textile knitting and weaving machine operators* put the yarn on machines that weave, knit, loop, or tuft it into a product. Woven fabrics are used to make apparel and other goods, while some knitted products—such as hosiery—and tufted products—such

as carpeting—emerge in near finished form. Different types of machines are used for these processes, but operators perform similar tasks. They repair breaks in the yarn and monitor the yarn supply, while tending many machines at once. *Textile cutting machine operators* trim the fabric into various widths and lengths, depending on its intended use.

Apparel workers. Apparel workers cut fabric and other materials and sew it into clothing and related products. Workers in a variety of occupations fall under the heading of apparel workers. *Tailors, dressmakers, and sewers* make custom clothing and alter and repair garments for individuals. However, workers in most apparel occupations are found in manufacturing where they perform specialized tasks in the production of large numbers of garments that are shipped to retail establishments for sale to the public.

Fabric and apparel patternmakers convert a clothing designer’s original model of a garment into a pattern of separate parts that can be laid out on a length of fabric. After discussing the item with the designer, these skilled workers usually use a computer to outline the parts and draw in details to indicate the position of pleats, buttonholes, and other features. (In the past, patternmakers laid out the parts on paper using pencils and drafting instruments, such as rulers.) Patternmakers then alter the size of the pieces in the pattern to produce garments of various sizes, and may “mark” the fabric showing the best layout of pattern pieces to minimize waste of material.

Once an item’s pattern has been made and marked, mass production of the garment begins. Cutters and trimmers take the patterns and cut out material. They must pay close attention to their work because mistakes are costly. They place multiple layers of material on the cutting table and use an electric knife or other cutting tools to cut out the various pieces of the garment following the outline of the pattern; delicate materials may be cut by hand. In some companies, computer-controlled machines do the cutting.

Sewing machine operators join the parts together, reinforce seams, and attach buttons, hooks, zippers, and accessories to produce clothing. After the product is sewn, other workers remove lint and loose threads and inspect and package the garments.

Shoe and leather workers. Shoe and leather workers are employed either in manufacturing or in personal services. In shoe manufacturing, *shoe machine operators and tenders* operate a variety of specialized machines that perform cutting, joining, and finishing functions. In personal services, *shoe and leather workers and repairers* perform a variety of repairs and custom leatherwork for members of the general public. The construct, decorate, or repair